

CAMBRIDGE.—Mr. J. E. Marr, F.R.S., Fellow of St. John's College, has been reappointed University Lecturer in Geology for five years.

The Council of the Senate propose to submit a grace for the appointment of a syndicate to consider what further rights or privileges (if any) should be granted to women students by the University, and in particular whether they should be admissible to degrees.

The Special Board for Biology propose that the arrangement subsisting for the last twenty years between the University and the Zoological Station at Naples should be renewed for a further period of five years. This arrangement secures for University students the use of a table in the laboratory and facilities for research, in consideration of an annual payment to Dr. Dohrn of £100 from the Worts Travelling Scholars Fund.

THE Board of Agriculture has made a grant of £650 to the Glasgow and West of Scotland Technical College. The same amount was granted to the College last year.

IN Paris the Société de Topographie is making an effort to establish topography as an ordinary subject of instruction, and has published a circular and syllabus for the purpose.

THE Russian Government has, says the *British Medical Journal*, assigned an annual grant, equivalent to about £10,000, to the Medical School for Women in St. Petersburg. The city undertakes to provide £2400, and private munificence has raised an endowment fund of £70,000. Preliminary courses are already being given.

THE following are among recent appointments abroad: Dr. Eigenbrodt to be Extraordinary Professor of Surgery at Leipzig; Dr. Lenhossék to be Extraordinary Professor of Anatomy at Tübingen; Dr. M. Valsilieff to be Extraordinary Professor of Theoretical Surgery at Warsaw; Dr. Eliza M. Mosher to be Professor of Hygiene in the University of Michigan.

THE following announcements are made in *Science*:—Mr. Joseph Bannigan has given 4000 dols. to the Catholic University of America, and has made known his intention to donate for twelve years 4000 dols. a year for library purposes. By the will of the late Mrs. Doyon, the University of Wisconsin has received 5000 dols., the income of which is to be devoted to scholarships for young women. Two scholarships of 2000 dols. each have been presented to Tufts College, one by Mrs. A. B. Perkins, and the other by J. S. and H. N. White.

THE disasters of the late war seem to be teaching the Chinese that the traditional attitude of distrust and exclusion of Western civilisation cannot any longer be safely maintained. It may be taken as a sign of the times that the Vice-Regent of Tientsin has entertained a proposal to start a university upon the European model. The university is particularly intended to foster the technical sciences, and will be connected with a preparatory school. Mr. Charles D. Jenney will undertake its direction, and the staff will be partly composed of foreigners. The autumn of this year is to see the opening of the school and university.

THE Apprentices' Institution has recently instituted inquiries among a large number of trade societies and workmen's clubs with a view to ascertaining the opinion of working men themselves upon the apprenticeship system. From the standpoint of the advocates of technical education, the results of their enquiry are very satisfactory. A unanimous affirmative was given by all the trades to the questions—Is your Society of opinion that instruction for a number of years in the workshop is essential to the trained mechanic? But especially valuable and significant is the emphatic "No" to the question—Is your Society of opinion that the instruction afforded in the technical schools is sufficient training for a skilled mechanic with apprenticeship? Asked what they think, whether the instruction in technical schools should be given during apprenticeship or before it, the answer was in the large majority of cases "during apprenticeship." Putting side by side with this the remark of Mr. Reynolds, of Manchester, the Chairman of the Directors, and Organising Secretaries for Technical and Secondary Education, at their recent meeting, that the great difficulty the technical schools had to contend with was the want of preparation exhibited by the pupils who present themselves for instruction in the technical schools, it becomes abundantly manifest what policy ought to be pursued by the Technical Instruction Committees throughout the country.

As we recorded in our issue of February 14, 1895, the County Council of Hampshire resolved to devote £6000 of the surplus of the funds available for technical education during the preceding year to general purposes in the county. It would seem that they are not to be deterred from their retrograde policy by the unanimous protests of the various educational papers, for at the quarterly meeting of the Council, held on the 10th inst., a motion was proposed by the Chairman of the Finance Committee—"That the Finance and Technical Education Committees be instructed to meet together and report to the meeting in May 1896, their opinion upon the manner in which the balance remaining after the annual expenditure on technical education has been defrayed, shall be dealt with." It appears that, notwithstanding the transfer of £6000 from the technical education account towards the cost of the county buildings, up to December 31 last, and taking the estimate to the end of March next, there would be a balance of £12,000. Though the Chairman of the Technical Instruction Committee assured the Council there was no prospect of having a large balance to deal with in the future, evidently meaning that the Committee had every need of this money which they were reserving, the motion was put and carried. It would be supposed from an action such as this, that Hampshire is already well supplied with every kind of secondary education; but is it so? At Southampton, which it is true receives *its share* of the whole grant, there are at least two institutions which are in want of assistance. The Hartley Institution, which receives a county grant of only £75 per annum, is badly crippled for want of funds. The Grammar School similarly is greatly in want of help to develop the technical side of its work, and the same condition of things is true in many other of the local centres. In addition to all this, one hears repeatedly of the urgent need of Schools of Forestry in this country, and yet Hampshire, with the New Forest in its midst, has £12,000 for which it has no educational use!

PARTICULARS are tabulated in the *Technical Education Gazette* of the principal scholarships which are awarded in London, giving free education or education at reduced fees—(1) at the public secondary schools; (2) at universities, university colleges, polytechnics, technical institutes, and other places of higher education; (3) at schools of art. The tables are intended to give some idea as to the opportunities that are offered to the inhabitants of London of obtaining education above the elementary grade, either entirely free or at greatly reduced cost. The total number of scholarships tenable at public secondary schools appear to be as follows: Boys—1240 per annum (of which all except 85 may be regarded as actually available for pupils in public elementary schools). Girls—543 per annum (of which all except 8 may be regarded as actually available for pupils in public elementary schools). Total—1783 per annum (of which as many as 1690 are actually available for pupils in public elementary schools). Taking the average number in attendance in public elementary schools (exclusive of infants) as 382,121, it is found that the number of scholarships available per 1000 children in attendance is 4.4, of which 1.5 per 1000 children are provided by the Technical Education Board of the London County Council. The majority of the scholarships tenable at universities, university colleges, polytechnics, and similar institutions, are restricted as regards the school previously attended, but unrestricted so far as residence is concerned, though some are confined to residents within the county of London. No notice is taken of the numerous scholarships and exhibitions offered by university authorities outside London, such as the colleges of Oxford or Cambridge, but an attempt is made to show the facilities for acquiring training of a university type offered to pupils who are educated or who reside in London. The table shows that the scholarships available in London for giving training of a university type are as follows: open to young men only, 240; open to young men or young women, 120; open to young women only, 40; making a total of 400. These scholarships do not include, however, those that are specially awarded by the City Companies.

SCIENTIFIC SERIALS.

American Journal of Mathematics, vol. xviii. No. 1, January, 1896.—"Sur la réduction à sa forme canonique de la structure d'un groupe de transformations fini et continu," by E. Cartan. This memoir occupies 61 pages. We state the most important results in the writer's own words: "On peut toujours par des

opérations *rationnelles* ramener le problème au cas où le groupe est *semi-simple*, et même reconnaître d'avance la *nature* des sous-groupes invariants simples qui *composent* le groupe. . . . Quant à la réduction à sa forme canonique de la structure d'un groupe simple, elle dépend d'une certaine équation algébrique dont le groupe de substitutions, au sens de Galois, est connu; cette équation s'appelle *l'équation caractéristique* du groupe. Les différents groupes de substitutions qui s'introduisent ainsi ne présentent rien d'intéressant et se relient immédiatement aux groupes symétriques de n lettres. Néanmoins trois d'entre eux offrent un intérêt particulier et sont isomorphes, l'un avec le groupe des 27 droites d'une surface du 3^e ordre, l'autre avec le groupe des 28 tangentes doubles d'une courbe du 4^e ordre, le dernier avec le 7^e groupe hypoabélien de 120 lettres. Ce n'est pas un des résultats les moins intéressants et les moins inattendus de cette étude, que d'établir une relation entre ces groupes de substitutions de Galois et les groupes de transformations de M. Lie."—Mr. A. L. Baker writes upon algebraic symbols. The symbols considered are $+$, $-$, $i(\sqrt{-1})$, and $-i$. The closing sentences will indicate the line of reasoning. "In tri-dimensional domains we have $(\sqrt{-})^{\infty} x = x + iy + jv + kw$, a quaternion. Is this a hint that in the Calculus of Reals, Complex Functions and Quaternions, we have run the gamut of the Algebraic Calculi?" There is some (to us) novel notation in this article. To express the roots of the Solvable Quantics as symmetrical functions of homologues, is the title of an interesting algebraic article by C. H. Kummell. There is, it may be inferred, some stiff reading in these three articles.—Two short notes on singular solutions by J. M. Page, and on a point of the theory of functions by A. S. Chessin, close the number, which is adorned with a fine portrait of the French mathematician, M. Paul Appell.

Bulletin of the Mathematical Society, vol. ii. No. 4, January. —On the convergence of the series used in the subject of perturbations, by Dr. G. W. Hill. M. Poincaré ("Les Méthodes nouvelles de la Mécanique céleste") has recently insisted that certain series, in this subject, under a certain condition, are, in the rigorous mathematical sense, divergent. Dr. Hill thinks that the reasons brought forward to sustain this opinion are scarcely convincing, and so, without attempting to find a flaw in M. Poincaré's logic, he aims at pointing out a class of cases where the convergency can be shown in spite of the incommensurability of the component arguments.—Mr. R. A. Roberts contributes an article on the locus of the foci of conics having double contact with two fixed conics.—Note on the common tangents of two similar cycloidal curves, by Prof. F. Morley. This is the application of a new method, given by the writer in vols. xv. and xvi. of the *American Journal of Mathematics*, to a question proposed by Prof. Aiyar, in the *Educational Times* for November 1895.—The list of new publications is an extended one, and the notes, as usual, are of interest. There is, however, an error in the quotation from our pages. On p. 651 (vol. lii.) is given a list of names proposed for the Council of the London Mathematical Society, and at the end of the note it is stated that Mr. Jenkins and the late G. C. De Morgan were elected joint secretaries (in January 1866). The *Bulletin* says, "the late Prof. De Morgan." It is a matter of common knowledge that Prof. Augustus De Morgan was the first President. The Secretary was his son.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 23.—"An Attempt to Determine the Condition in which Helium and the Associated Gases exist in Minerals." By Prof. W. A. Tilden, F.R.S.

From the results of the experiments recorded in this paper, it seems that helium exists in the minerals in which it is found in a condition comparable with that in which hydrogen is associated with many metals, and carbonic oxide especially with iron. Whether this condition is rightly distinguished from ordinary chemical combination is a question which admits of debate. The stability of all dissociable compounds is influenced by pressure and by temperature in the same kind of way as "occlusion," which, like ordinary chemical combination again, is a phenomenon in which the bodies concerned exercise a power of selection.

The presence of hydrogen as well as carbon dioxide in granite,

if already observed, is not known to geologists generally. From observation on variations in the critical point of carbon dioxide in minerals (*Journ. Chem. Soc.*, 1876, ii. 248), Hartley seems to infer that the incondensable gas present with carbon dioxide, is usually nitrogen. A passage in Geikie's "Text-Book of Geology," third edition, p. 110, refers to the presence of hydrogen in cavities; but no information is given as to the evidence upon which this statement is based. The presence of hydrogen in such a rock as granite must be attributed to the existence of this gas in large proportion in the atmosphere in which the rock was crystallised. Whether this was the primeval atmosphere of the earth before the hydrogen had escaped or had been oxidised into water, or whether it resulted from the local action of water upon unoxidised metals or other materials in the interior of the earth, is a question which may be of some interest to the geologist. If the former hypothesis were adopted, it would perhaps be difficult to explain the absence of helium from the gas included in the rock; and, on the whole, the latter view appears to afford the more probable explanation.

Experiments show that hydrogen is present in even larger proportion in the granite from the neighbourhood of Dublin, and it is proposed to examine some other examples of the ancient crystalline rocks in order to determine the nature of the gases enclosed in them.

Physical Society, February 14.—Annual General Meeting. —Captain W. de W. Abney, President, in the chair.—The Chairman, after referring to the position of the Society, called upon the Treasurer to read the balance-sheet. After a discussion on the financial status of the Society, in which a number of members took part, the ballot was held for the election of a President and Council for the ensuing year. The following gentlemen were declared duly elected: President—Captain W. de W. Abney, C.B., F.R.S. Vice-Presidents—Shelford Bidwell, F.R.S.; Major-General E. R. Festing, F.R.S.; Prof. J. Perry, F.R.S.; G. Johnstone Stoney, F.R.S. Secretaries—T. H. Blakesley, 3 Eliot Hill, Lewisham, S.E.; and H. M. Elder, 50 City Road, E.C. Treasurer—Dr. E. Atkinson, Portesbury Hill, Camberley, Surrey. Demonstrator—C. Vernon Boys, F.R.S. Other members of Council—Walker Bailly, Dr. C. V. Burton; L. Fletcher, F.R.S.; R. T. Glazebrook, F.R.S.; Prof. A. Gray, G. Griffith, Prof. G. M. Minchin, F.R.S.; Prof. W. Ramsay, F.R.S.; Prof. S. P. Thompson, F.R.S.; and Prof. S. Young, F.R.S.—The Chairman read an obituary notice of the late Right Hon. T. H. Huxley.—A vote of thanks to the auditors was proposed by Prof. Carey Foster, seconded by Mr. Enright, and carried unanimously. A vote of thanks to the officers was proposed by Prof. A. Gray, seconded by Mr. Rhodes, and carried unanimously. A vote of thanks to the Chemical Society for the use of their rooms, was proposed by the Chairman, and carried by acclamation.—The meeting was then resolved into an ordinary science meeting, and a paper, on the determination of high temperatures by the maldometer, by Prof. Ramsay and Mr. Eumorfopoulos, was read by the latter. The maldometer—an instrument invented by Dr. Joly, of Dublin—consists essentially of a thin platinum strip which can be heated by the passage of an electric current. Small fragments of a solid substance are placed on the platinum strip, and the temperature at which they melt is deduced from the length of the platinum strip, which has been previously calibrated by means of solids of known melting-point. The authors have used gold for the purpose of calibrating the strip, and have assumed Viölle's value, 1045° C., for the melting-point of gold. A number of measurements have been made of the melting-point of salts of sodium, lithium, strontium, barium, calcium, and lead. The results obtained, however, differ considerably from those of Heycock and Neville, and the authors have not been able to account for these differences. Prof. Ramsay said the chief advantage of the maldometer was that only a very minute fragment of the substance was required for the measurement, so that extreme purity of the sample could be secured. There was the disadvantage, however, that many substances undergo some change when heated in air. In reply to a question from Mr. Blakesley, Prof. Ramsay said that the property of the platinum which was used to measure the temperature was its expansion. Mr. Campbell asked whether the zero of the instrument was found to be constant. In Cardew voltmeters it often took several hours for the needle to come back to zero after heating. Mr. Eumorfopoulos, in reply, said that the zero was constant to within a quarter of a degree.—Prof. Ramsay also exhibited a small direct-vision spectroscope, in which the eye-piece is moved